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HTLV III VIRUS ISOLATION STUDIES

ANNUAL/FINAL REPORT

TRAN C. CHANH

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) A systematic viral isolation study has been performed on peripheral blood lymphocytes obtained from Air Force personnel positive for antibodies to the human immunodeficiency virus (HIV-1) as assessed by HIV-ELISA and/or immunoblot assays. The co-culture technique employed for viral isolation involves admixing with PHA-activated PBL from normal donors as target cells in the presence of interleukin 2 (IL-2). Assays to determine reverse transcriptase (RT) activity in the culture supernatants were used to detect productive viral infectivity <u>in vitro</u> . RT-negative samples were further tested for the presence of HIV-p24 antigen. The results of this viral isolation study in combination with neurological, clinical, and immunological manifestations assessed by the Wilford Hall USAF Medical Center personnel should contribute to our increased understanding of the natural history of the acquired immunodeficiency syndrome.					
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FINAL TECHNICAL REPORT

Viral isolation has been performed on peripheral blood lymphocytes (PBL) from Air Force personnel with confirmed positive antibodies to the human immunodeficiency virus (HIV).

The PBL were obtained by Ficoll-Hypaque density centrifugation of fresh whole blood. $5 \times 10^6/5$ ml of purified PBL were co-cultured with an equal number of PHA-activated human lymphocytes from normal donors in the presence of 100 U/ml of interleukin 2 (IL-2) for a period of three weeks. Culture supernatants were collected on days 7, 10, 14, 17, and 21 of culture and frozen at -80°C for reverse transcriptase (RT) assay. The RT assay is done essentially as described (1). Cultures yielding RT activity threefold greater than control cultures were scored positive for productive infection in vitro. The culture supernatants with RT activity lower than threefold compared to that of control cultures were further assessed for the presence of HIV-p24 employing Coulter's p24 antigen capture assay which is more sensitive than the RT assay. Table 1 shows the results of the RT and the p24 antigen capture assays of all patients since September 1988. There were some RT-negative culture supernatants prior to December 1988 on which p24 antigen capture assay was not done. This was because we (in collaboration with Wilford Hall) did not complete our assessment of Coulter's p24 antigen capture assay with regard to its specificity and sensitivity until around the end of last year.

REFERENCE

1. Chanh, T.C., Dreesman, G.R., Kanda, P., Linette, G.P., Sparrow, J.T., Ho, D.D., and Kennedy, R.C. Induction of anti-HIV neutralizing antibodies by synthetic peptides. EMBO J. 5:3065-3071, 1986.

TABLE 1. HIV ISOLATION FROM PATIENTS' LYMPHOCYTES

RT (cpm) RESULTS									
PT #	Collection Date	Day 7	Day 10	Day 14	Day 17	Day 21	P/N	p 24	WR Stat
95	09/13/88	7948 (10.8)	11881 (16.1)	6222 (8.4)	3481 (4.7)	2023 (2.7)	+	N.A.	1A
130	09/13/88	715 (.97)	1587 (2.1)	782 (1.06)	828 (1.12)	1048 (1.42)	-	N.D.	2A
156	09/13/88	921 (1.25)	741 (1.00)	5267 (7.1)	12727 (17)	4953 (6.7)	+	N.A.	1A
182	09/13/88	2498 (3.4)	4400 (5.7)	4700 (6.4)	4279 (5.8)	3322 (4.5)	+	N.A.	2A
563	09/13/88	5140 (2.3)	7229 (3.0)	6491 (2.7)	8577 (3.5)	6558 (2.7)	+	N.A.	1A
589	09/13/88	2622 (1.0)	3156 (1.3)	6085 (2.5)	5771 (2.4)	3078 (1.28)	±	N.D.	1A
615	09/13/88	-	-	3067 (4.17)	2459 (3.3)	1357 (1.8)	+	N.A.	1A
663	09/13/88	13798 (18.7)	11231 (15.3)	11361 (15.4)	6661 (9.07)	4205 (5.7)	+	N.A.	1A
833	09/13/88	714 (.9)	757 (1.01)	745 (1.01)	755 (1.02)	983 (1.33)	-	N.D.	1A
836	09/13/88	778 (1.05)	585 (.79)	1506 (2.05)	1964 (2.6)	2074 (2.82)	±	N.D.	2B
37	09/20/88	-	11372 (4.7)	8802 (3.6)	3100 (1.29)	2678 (1.11)	+	N.A.	6A
136	09/20/88	-	3695 (1.53)	11937 (4.9)	8738 (3.6)	2970 (1.2)	+	N.A.	2A
555	09/20/88	-	9502 (3.9)	13449 (5.5)	8395 (3.5)	6245 (2.59)	+	N.A.	3A
600	09/20/88	-	13900 (5.7)	12445 (5.1)	9308 (3.8)	2380 (.99)	+	N.A.	1A
832	09/20/88	-	15068 (6.2)	19573 (8.1)	6949 (2.8)	5448 (2.2)	+	N.A.	2A
837	09/20/88	-	3855 (1.6)	6271 (2.6)	12285 (5.1)	6661 (2.7)	+	N.A.	1A
2393	09/20/88	-	3200 (1.3)	3163 (1.3)	3507 (1.4)	2653 (1.1)	-	N.D.	"U"
124	09/27/88	2016 (.8)	2966 (1.2)	4937 (2.0)	4135 (1.7)	2828 (1.1)	-	N.D.	4A
604	09/27/88	2523 (1.0)	2981 (1.24)	4189 (1.74)	2664 (1.10)	2384 (.99)	-	N.D.	1A
605	09/27/88	3530 (1.4)	2352 (.97)	2969 (1.23)	3001 (1.2)	3210 (1.3)	-	N.D.	2A
612	09/27/88	3476 (1.4)	2279 (.94)	7912 (3.2)	5821 (2.4)	4272 (1.7)	+	N.A.	1A
626	09/27/88	992 (.988)	6365 (6.3)	1195 (1.2)	6820 (6.8)	-	+	N.A.	3B
678	09/27/88	3126 (1.3)	4152 (1.7)	4190 (1.7)	8289 (3.4)	2930 (1.2)	+	N.A.	2A
839	09/27/88	2659 (1.1)	4930 (2.0)	6592 (2.7)	5051 (2.1)	2010 (.83)	±	N.D.	1A
121	10/04/88	1070 (2.0)	1125 (2.15)	1014 (1.9)	1270 (2.4)	1253 (2.4)	-	N.D.	2B
161	10/04/88	983 (1.9)	1031 (1.97)	1019 (1.9)	1647 (3.1)	1088 (2.1)	+	N.D.	1A
321	10/04/88	1650 (3.15)	1564 (2.99)	1770 (3.4)	1284 (2.45)	1638 (3.1)	+	N.D.	4A
635	10/11/88	1663 (3.2)	1065 (2.0)	1071 (2.0)	1055 (2.0)	1206 (2.3)	+	N.A.	1A
68	10/18/88	1724 (3.3)	1191 (2.3)	1245 (2.4)	1214 (2.3)	1161 (2.2)	+	N.A.	2A
105	10/18/88	969 (1.8)	1200 (2.3)	1068 (2.0)	1115 (2.1)	-	-	N.D.	2A
392	10/18/88	1050 (2.0)	1709 (3.3)	-	-	-	+	N.A.	2A
613	10/18/88	1063 (2.0)	1144 (2.2)	-	-	-	-	N.D.	2A
660	10/18/88	1605 (3.1)	1223 (2.3)	1367 (2.6)	1459 (2.8)	-	+	N.A.	1A
848	10/25/88	1337 (1.3)	56652 (56.5)	16646 (16.6)	2188 (2.2)	2822 (2.8)	+	N.A.	1A
610	10/25/88	2302 (2.3)	10703 (10.7)	45745 (45.6)	9653 (9.6)	1709 (1.7)	+	N.A.	1A
195	11/01/88	4411 (4.4)	3303 (3.3)	1940 (1.9)	1200 (1.2)	-	+	N.A.	5A
196	11/01/88	2033 (2.0)	2544 (2.5)	4595 (4.6)	10352 (10.3)	-	+	N.A.	1A
552	11/01/88	5975 (5.9)	3400 (3.4)	22075 (21.9)	26921 (26.8)	-	+	N.A.	1A
627	11/01/88	7818 (7.8)	1177 (1.2)	2745 (2.7)	4158 (4.1)	-	+	N.A.	1A
850	11/01/88	13793 (13.7)	1502 (1.5)	2359 (2.3)	1637 (1.6)	-	+	N.A.	3A
851	11/01/88	1361 (1.4)	15380 (15.3)	22204 (22.1)	1175 (1.2)	-	+	N.A.	1A
187	11/22/88	-	-	-	920 (.797)	1859 (1.6)	-	+	2A
571	11/22/88	-	-	-	2016 (1.7)	991 (.858)	-	No sup. on hand	6B
80	11/29/88	-	1251 (1.08)	428 (.37)	1539 (1.3)	1092 (.946)	-	+	5B
679	11/29/88	-	2282 (1.97)	897 (.777)	7417 (6.4)	1069 (.926)	+	N/A	1A
685	11/29/88	-	2571 (2.2)	1382 (1.19)	1115 (.966)	-	-	+	2A
770	11/29/88	-	4435 (3.8)	745 (.645)	2559 (2.2)	351 (.30)	+	N/A	1B

RT (cpm) RESULTS									
PT #	Collection Date	Day 7	Day 10	Day 14	Day 17	Day 21	P/N	p 24	WR Stat
852	11/29/88	-	1267 (1.09)	1018 (.88)	1246 (1.07)	721 (.52)	-	+	1A
109	12/13/88	1911 (2.69)	2313 (3.26)	1079 (1.5)	1064 (1.5)	820 (1.15)	+	N/A	6B
380	12/13/88	853 (1.2)	1044 (1.47)	1758 (2.47)	1585 (2.2)	985 (1.38)	-	+	2A
624	12/13/88	910 (1.28)	802 (1.1)	1131 (1.59)	717 (1.0)	790 (1.1)	-	+	2A
863	12/13/88	1698 (2.39)	1510 (2.1)	924 (1.3)	1106 (1.55)	1112 (1.56)	-	+	5A
864	12/13/88	1173 (1.65)	1168 (1.6)	1099 (1.55)	1035 (1.45)	644 (.908)	-	+	5A
865	12/13/88	861 (1.2)	979 (1.38)	1578 (2.2)	1510 (2.1)	1211 (1.7)	-	+	2A
219	12/06/88	1514 (1.65)	4743 (5.18)	1071 (1.17)	1112 (1.2)	1414 (1.5)	+	N/A	1A
222	12/06/88	1394 (1.5)	2464 (2.69)	1988 (2.17)	1931 (2.1)	2361 (2.58)	±	+	6B
604	12/06/88	1163 (1.27)	1510 (1.65)	1736 (1.89)	1577 (1.7)	2229 (2.4)	-	+	1A
634	12/06/88	1888 (2.06)	1688 (1.8)	3603 (3.9)	1338 (1.46)	1526 (1.66)	+	N/A	2A
860	12/06/88	1211 (1.3)	1416 (1.5)	1593 (1.7)	2214 (2.4)	1579 (1.7)	-	+	1A
862	12/06/88	1157 (1.26)	903 (.987)	1586 (1.7)	1385 (1.5)	4398 (4.8)	+	N/A	1A
5734	12/06/88	1097 (1.2)	1655 (1.8)	3922 (4.29)	1859 (2.0)	1633 (1.78)	+	N/A	"U"
466	12/20/88	1686 (1.46)	491 (.425)	1302 (1.1)	707 (.61)	739 (.64)	-	-	2B
514	12/20/88	1004 (.87)	940 (.81)	1369 (1.18)	622 (.538)	869 (.75)	-	+	2A
709	12/20/88	938 (.81)	2814 (2.4)	857 (.74)	331 (.286)	2557 (2.2)	-	+	5A
797	12/20/88	435 (.376)	768 (665)	742 (.64)	417 (.36)	838 (.726)	-	+	2A
89	1/10/89	746 (1.2)	603 (.97)	472 (.76)	916 (.467)	945 (1.27)	-	-	1A
157	1/10/89	675 (1.08)	526 (.847)	729 (1.17)	794 (.405)	490 (.66)	-	-	4A
228	1/10/89	692 (1.1)	441 (.71)	462 (.74)	1124 (.5741)	858 (1.16)	-	-	2B
383	1/10/89	634 (1.0)	766 (1.2)	537 (.86)	924 (.47)	955 (1.29)	-	-	1A
526	1/10/89	925 (1.48)	489 (.787)	403 (.648)	1009 (.51)	746 (1.008)	-	-	2B
590	1/10/89	708 (1.1)	645 (1.0)	464 (.747)	1118 (.57)	475 (.64)	-	-	2A
684	1/10/89	860 (1.38)	536 (.86)	209 (.336)	797 (.407)	591 (.799)	-	-	2A
694	1/10/89	1168 (1.88)	555 (.89)	391 (.629)	939 (.479)	721 (.9756)	-	-	2A
697	1/10/89	566 (.91)	490 (.789)	683 (1.09)	1014 (.517)	1022 (1.38)	-	+	2A
699	1/10/89	793 (1.27)	501 (.806)	576 (.927)	261 (.13)	1340 (1.8)	-	-	1B
757	1/10/89	785 (1.26)	401 (.645)	626 (1.0)	885 (.45)	817 (1.105)	-	-	2B
867	1/10/89	2430 (3.9)	1406 (2.26)	608 (.979)	740 (.377)	840 (1.135)	+	N/A	1A
869	1/10/89	531 (.855)	393 (.63)	481 (.77)	1049 (.535)	627 (.849)	-	-	1A
871	1/10/89	627 (1.0)	438 (.705)	620 (.998)	1000 (.51)	1024 (1.38)	-	-	1A
655	1/17/89	2061 (.655)	2876 (.91)	2298 (.73)	2942 (.935)	1827 (.58)	-	-	1A
712	1/17/89	2567 (.816)	2477 (.787)	2543 (.808)	2422 (.77)	2167 (.689)	-	-	1A
726	1/17/89	2063 (.656)	2750 (.87)	1812 (.576)	2051 (.65)	2081 (.66)	-	-	2A
876	1/17/89	2186 (.69)	2025 (.64)	2006 (.638)	2134 (.678)	1962 (.62)	-	-	1A
176	1/23/89	2719 (.86)	2389 (.759)	2737 (.87)	2681 (.85)	2325 (.739)	-	-	4B
293	1/23/89	2151 (.68)	2484 (.79)	2065 (.656)	2250 (.715)	2724 (.866)	-	+	1A
135	1/23/89	3407 (1.08)	2618 (.83)	2559 (.81)	2215 (.70)	2347 (.746)	-	+	1A
233	1/23/89	3073 (.977)	2965 (.94)	3522 (1.12)	4422 (1.4)	2701 (.859)	-	+	6A
768	1/23/89	2950 (.938)	2752 (.875)	2915 (.927)	2548 (.81)	2365 (.75)	-	+	2A
170	1/23/89	2635 (.838)	2814 (.895)	2075 (.66)	2670 (.849)	1644 (.52)	-	-	4B
415	1/23/89	3377 (1.07)	2796 (.889)	2031 (.646)	1869 (.59)	2049 (.65)	-	-	2B
245	1/23/89	2402 (.76)	2721 (.865)	2281 (.725)	2554 (.81)	2387 (.759)	-	+	2A
343	1/23/89	3151 (1.0)	6763 (2.15)	5967 (1.89)	6492 (2.06)	3447 (1.09)	-	+	2A
91	1/24/89	538 (.727)	645 (.87)	652 (.64)	588 (.578)	740 (.727)	-	-	3A
287	1/24/89	682 (.92)	604 (.816)	648 (.637)	692 (.68)	583 (.57)	-	-	1A
293	1/24/89	657 (.888)	698 (.94)	499 (.49)	671 (.659)	1286 (1.26)	-	-	1A
323	1/24/89	863 (1.16)	934 (1.26)	607 (.596)	1267 (1.2)	593 (.58)	-	+	1A

RT (cpm) RESULTS									WR
PT #	Collection Date	Day 7	Day 10	Day 14	Day 17	Day 21	P/N	p 24	Stat
465	1/24/89	947 (.128)	801 (.108)	728 (.715)	768 (.755)	625 (.61)	-	-	1A
545	1/24/89	506 (.68)	607 (.82)	793 (.779)	1246 (1.2)	874 (.859)	-	-	1A
729	1/24/89	791 (.107)	1202 (1.6)	4516 (4.4)	833 (.818)	793 (.779)	+	N/A	2B
777	1/24/89	524 (.709)	780 (1.05)	1565 (1.5)	1065 (1.0)	836 (.82)	-	-	1B
322	1/31/89	2630 (.836)	2968 (.94)	2894 (.92)	2779 (.88)	1876 (.59)	-	+	2B
326	1/31/89	2647 (.84)	2422 (.77)	1978 (.629)	1975 (.628)	2240 (.71)	-	+	2A
377	1/31/89	2296 (.73)	2533 (.805)	2240 (.71)	2194 (.697)	1699 (.54)	-	+	2B
570	1/31/89	2483 (.789)	2106 (.669)	2574 (.818)	2119 (.67)	2231 (.709)	-	+	2B
650	1/31/89	3629 (1.15)	3518 (1.1)	2500 (.79)	3259 (1.0)	2193 (.697)	-	+	3A
822	1/31/89	2372 (.75)	2238 (.711)	2250 (.715)	2164 (.688)	1783 (.567)	-	+	2A
884	1/31/89	1802 (.57)	2633 (.837)	2185 (.695)	2310 (.73)	1744 (.55)	-	+	1A
886	1/31/89	2496 (.79)	1982 (.63)	2491 (.79)	1527 (.485)	2317 (.737)	-	-	1A
88	2/07/89	1183 (1.3)	912 (1.0)	1409 (1.55)	877 (.968)	1881 (2.07)	-	+	2A
234	2/07/89	1567 (1.7)	1088 (1.2)	801 (.88)	906 (1.0)	849 (.937)	-	-	2A
580	2/07/89	2343 (2.58)	730 (.806)	1223 (1.3)	659 (.726)	905 (.99)	±	-	1A
658	2/07/89	1296 (1.4)	984 (1.08)	1063 (1.17)	804 (.88)	556 (.61)	-	-	1A
677	2/07/89	778 (.859)	971 (1.07)	721 (.795)	1298 (1.4)	1001 (1.1)	-	-	1A
720	2/07/89	1093 (1.2)	960 (1.05)	1227 (1.35)	1399 (1.5)	1846 (2.0)	-	+	2B
733	2/07/89	924 (1.0)	955 (1.05)	998 (1.1)	806 (.89)	698 (.77)	-	-	2A
768	2/07/89	3121 (3.44)	730 (.806)	903 (1.0)	1043 (1.15)	629 (.69)	+	+	2A
879	2/07/89	771 (.85)	792 (.87)	634 (.699)	940 (1.0)	688 (.759)	-	-	1A
881	2/07/89	1648 (1.8)	851 (.939)	657 (.725)	1808 (1.99)	887 (.979)	-	-	1A
890	2/07/89	1033 (1.1)	918 (1.0)	766 (.845)	857 (.945)	970 (1.07)	-	+	2A
245	2/14/89			CONTAMINATED					
392	2/14/89	576 (.67)	931 (1.08)	982 (1.14)	1106 (1.29)	1029 (1.2)	-	+	2A
401	2/14/89	1092 (1.27)	2337 (2.7)	1915 (2.2)	1444 (1.68)	915 (1.06)	±	+	1A
458	2/14/89	384 (.448)	696 (.81)	3774 (4.4)	702 (.82)	352 (.41)	+	N/A	2B
473	2/14/89	645 (.75)	3348 (3.9)	2385 (2.7)	3260 (3.8)	1441 (1.68)	+	+	2A
705	2/14/89	435 (.508)	591 (.689)	1004 (1.17)	3058 (3.57)	495 (.578)	+	N/A	1A
708	2/14/89	298 (.348)	2342 (2.7)	251 (.29)	524 (.61)	1202 (1.4)	±	-	2A
721	2/14/89	489 (.57)	846 (.987)	1492 (1.7)	642 (.75)	985 (1.15)	-	+	2A
723	2/14/89	1831 (2.1)	3656 (4.27)	367 (.429)	612 (.715)	1416 (1.65)	+	N/A	1B
892	2/14/89	400 (.467)	9104 (10.6)	3438 (4.0)	469 (.548)	1271 (1.48)	+	N/A	1A
36	2/21/89	958 (1.05)	725 (.80)	567 (.625)	1219 (1.3)	1187 (1.3)	-	-	2B
203	2/21/89	1782 (1.96)	1584 (1.7)	1904 (2.1)	1743 (1.9)	1293 (1.4)	-	+	5A
358	2/21/89	1024 (1.1)	878 (.969)	1080 (1.19)	860 (.949)	855 (.94)	-	+	1A
479	2/21/89	878 (.969)	808 (.89)	1504 (1.66)	965 (1.06)	2089 (2.3)	-	+	2A
889	2/21/89	2486 (2.7)	2133 (2.35)	2081 (2.3)	1910 (2.1)	1246 (1.4)	±	+	6B
257	2/28/89	1161 (.61)	1344 (.71)	1218 (.64)	1169 (.615)	1224 (.64)	-	+	2A
271	2/28/89	1435 (.755)	1317 (.69)	1114 (.586)	898 (.47)	733 (.386)	-	+	1A
274	2/28/89	1195 (.63)	1068 (.56)	1280 (.67)	1299 (.68)	1146 (.60)	-	+	1A
330	2/28/89	1127 (.59)	2054 (1.08)	919 (.48)	1462 (.769)	1221 (.64)	-	+	2A
363	2/28/89	955 (.50)	1246 (.656)	680 (.36)	1225 (.65)	641 (.34)	-	-	1A
532	2/28/89	988 (.52)	767 (.40)	887 (.47)	2349 (1.2)	744 (.39)	-	+	2B
778	2/28/89	884 (.465)	1236 (.65)	1104 (.58)	746 (.39)	990 (.52)	-	+	1A
894	2/28/89	441 (.23)	1198 (.63)	624 (.33)	1134 (.597)	930 (.49)	-	+	1A
897	2/28/89	1071 (.56)	728 (.38)	1594 (.84)	692 (.36)	930 (.49)	-	-	1A
899	2/28/89	904 (.48)	628 (.33)	1393 (.73)	742 (.39)	533 (.28)	-	-	1A
034	3/07/89	3050 (.989)	2541 (.82)	2935 (.95)	3284 (1.06)	2128 (.69)	-	-	1A

		RT (cpm) RESULTS							
PT #	Collection Date	Day 7	Day 10	Day 14	Day 17	Day 21	P/N	p 24	WR Stat
511	3/07/89	3481 (1.1)	2909 (.94)	3528 (1.1)	3041 (.986)	3234 (1.0)	-	+	3A
514	3/07/89	3096 (1.0)	3838 (1.2)	2406 (.78)	3140 (1.0)	3430 (1.1)	-	-	2A
583	3/07/89	2732 (.89)	3358 (1.08)	4124 (1.3)	3457 (1.1)	3388 (1.09)	-	+	1A
599	3/07/89	3100 (1.0)	2955 (.958)	2781 (.90)	4079 (1.3)	3383 (1.09)	-	-	2B
637	3/07/89	2655 (.86)	2845 (.92)	3786 (1.2)	3994 (1.3)	3849 (1.2)	-	+	4A
900	3/07/89	3520 (1.1)	2831 (.92)	3371 (1.1)	2962 (.96)	3143 (1.0)	-	-	1A
114	3/14/89	2711 (.87)	2050 (.66)	2223 (.71)	2357 (.757)	2324 (.746)	-	-	3A
123	3/14/89	2723 (.87)	5601 (1.79)	2255 (.72)	2743 (.88)	2610 (.838)	-	-	3A
510	3/14/89	2354 (.756)	2823 (.91)	2183 (.70)	3782 (1.2)	2100 (.67)	-	-	1A
792	3/14/89	2433 (.78)	2465 (.79)	2036 (.65)	2906 (.93)	2502 (.80)	-	-	1A
878	3/14/89	2675 (.859)	2800 (.899)	2271 (.73)	3341 (1.1)	2869 (.92)	-	-	1B
898	3/14/89	2743 (.88)	2246 (.72)	2347 (.75)	2854 (.916)	-	-	-	1A
215	3/21/89	3389 (1.08)	2766 (.89)	3534 (1.1)	2314 (.74)	2880 (.925)	-	-	1A
339	3/21/89	3498 (1.1)	3038 (.975)	2467 (.79)	4460 (1.4)	2555 (.82)	-	-	2A
769	3/21/89	2627 (.84)	2933 (.94)	2991 (.96)	2897 (.93)	2636 (.85)	-	-	1A
902	3/21/89	2745 (.88)	4180 (1.3)	2557 (.82)	2703 (.87)	4545 (1.5)	-	-	1A
231	3/28/89	2150 (.68)	2259 (.72)	1932 (.61)	2295 (.73)	1935 (.615)	-	+	2A
251	3/28/89	2802 (.89)	2390 (.76)	2367 (.75)	2010 (.64)	2388 (.76)	-	+	1A
258	3/28/89	2032 (.65)	2784 (.885)	1775 (.56)	2374 (.75)	2111 (.67)	-	+	2A
303	3/28/89	2335 (.74)	1817 (.577)	2071 (.658)	1946 (.619)	2016 (.64)	-	-	1A
327	3/28/89	2158 (.69)	1836 (.58)	1959 (.62)	2222 (.71)	2180 (.69)	-	+	1A
713	3/28/89	2175 (.69)	1948 (.62)	2574 (.82)	2326 (.74)	2143 (.68)	-	+	1A
764	3/28/89	3994 (1.3)	6501 (2.1)	4348 (1.4)	4362 (1.4)	2937 (.93)	-	+	1A
903	3/28/89	2124 (.675)	2061 (.655)	2186 (.69)	2313 (.735)	2036 (.647)	-	+	"U"